

MY MEAN FAMILY

Suggested Grade

7

SD Mathematics Strand & Standard (*Primary for Task*)

Statistics & Probability

7.S.1.1 Students are able to find the mean, median, mode, and range of a set of data.

Task Summary

Students demonstrate their understanding of mean, median, mode, and range by creating an imaginary family.

Time and Context of Task

Task can be completed in one class period or presented to the students in one class period to be completed by the following class period.

Materials Needed

Paper & Pencil, calculators (Optional)

Author and Lead Teacher for the Task

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Adapted from NCTM Mathematics

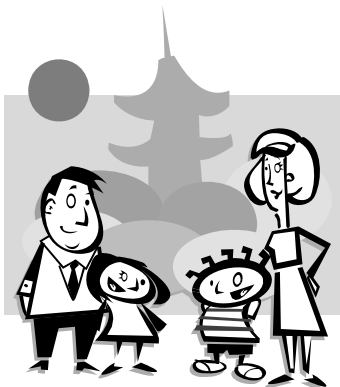
Assessment-A Practical Handbook for grades 6 – 8.

Developed by the San Francisco Unified School District Mentor Teacher Program.

MY MEAN FAMILY

You are a member of a family of 5. This imaginary family may be an extended family, that is to say it may include grandparents, aunt, uncles, and so on. You are one of the five people. The mean age of the family is 23 years.

- Name the family members and state their relationships to you.
- Be sure to provide everyone's age (including your own) and explain the math you found it necessary to use to determine these ages.
- Determine the range of ages for your imaginary family.
- Explain what it means if your imaginary family's ages has a mode.
- Determine the median age for you imaginary family.



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CONTENT STANDARDS

Primary Standard

Strand Name: Statistics & Probability

SD Goal: Students will apply statistical methods to analyze data and explore probability for making decisions and predictions.

Indicator: Use statistical models to gather, analyze, and display data to draw conclusions.

Standard: 7.S.1.1 Students are able to find the mean, median, mode, and range of a set of data.

Supplemental Standard

Strand Name: Number Sense

SD Goal: Students will develop and use number sense to investigate the characteristics of numbers in a variety of forms and modes of operation.

Indicator: Apply operations within the set of real numbers.

Standard: 7.N.2.1 Add, subtract, multiply, and divide integers and positive fractions.

NCTM Process Standards

Problem Solving

- Apply and adapt a variety of appropriate strategies to solve problems.

Communication

- Communicate mathematical thinking coherently and clearly to peers, teachers, and others.
- Use the language of mathematics to express mathematical ideas precisely.

Problem-Solving Strategies

- Estimation and check
- Working backward
- Acting out the problem

ASSESSMENT TOOLS

Task Rubric

Standard	Advanced	Proficient	Basic	Below Basic
7.S.1.1. Students are able to find the mean, median, mode, and range of a set of data.	Applies procedure accurately to correctly solve the problem and verify the results.	Mathematical procedures are used. All parts are correct and a correct answer is achieved.	Some parts may be correct but a correct solution is not achieved. Could not completely carry out mathematical procedures.	There were so many errors in the mathematical procedures that the problem could not be resolved.
7.N.2.1 Add, subtract, multiply, and divide integers and positive fractions.	90-100% of the steps and solutions have no mathematical errors.	Almost all (85-89%) of the steps and solutions have no mathematical errors.	Most (75-84%) of the steps and solutions have no mathematical errors.	More than 75% of the steps and solutions have mathematical errors.
Problem Solving: Apply and adapt a variety of appropriate strategies to solve problems.	Uses an efficient and effective strategy to solve the problem(s).	Uses an effective strategy to solve the problem(s).	Sometimes uses an effective strategy to solve problems, but does not do it consistently.	Rarely uses an effective strategy to solve problems.
Communications Communicate mathematical thinking coherently and clearly to peers, teachers, and others.	There is a clear, effective explanation detailing how the problem is solved. All of the steps are included so that the reader does not need to infer how and why decisions were made.	There is a clear explanation of how the problem is solved.	There is an incomplete explanation of how the problem is solved. It may not be clearly presented.	There is no explanation of the solution, the explanation cannot be understood, or is unrelated to the problem.

Rubric created with assistance of <http://rubistar.4teachers.org/index.php>

**Seventh Grade Statistics & Probability
Performance Descriptors**

Advanced	Seventh grade students performing at the advanced level: <ul style="list-style-type: none"> organize and represent data in various forms and use results to make predictions; find measures of central tendency; make predictions using theoretical probability of an independent event.
Proficient	Seventh grade students performing at the proficient level: <ul style="list-style-type: none"> organize and represent data in various forms and make predictions from given graphs; find measures of central tendency given a set of data; find the probability of a simple event.
Basic	Seventh grade students performing at the basic level: <ul style="list-style-type: none"> represent data in various forms; find mean, mode, and range of a given set of data; find the probability of a simple event given pictorial representation.

**Seventh Grade Statistics & Probability
ELL Performance Descriptors**

Proficient	Seventh grade ELL students performing at the proficient level: <ul style="list-style-type: none"> gather, organize, and display data in graphs to solve problems; find measures of central tendency of a given data set; find probability of a simple event; read, write, and speak the basic language of statistics and probability.
Intermediate	Seventh grade ELL students performing at the intermediate level: <ul style="list-style-type: none"> represent data in various forms; find mean, mode, and range of a given data set; find the probability of simple events given pictorial representations; read and answer directed questions about data in graphs; explain in mathematical terms the sequence of steps used in solving problems; give simple oral or written responses to directed questions on topics presented in class.
Basic	Seventh grade ELL students performing at the basic level: <ul style="list-style-type: none"> find the probability of simple events given pictorial representations or concrete materials; recognize and use basic statistics and probability terms; respond to yes or no questions and to problems presented pictorially or numerically in class.
Emergent	Seventh grade ELL students performing at the emergent level: <ul style="list-style-type: none"> copy and write statistics and probability symbols and figures; imitate pronunciation of statistics and probability terms; use non-verbal communication to express mathematical ideas.
Pre-emergent	Seventh grade ELL students performing at the pre-emergent level: <ul style="list-style-type: none"> observe and model appropriate cultural and learning behaviors from peers and adults; listen to and observe comprehensible instruction and communicate understanding non-verbally.

MY MEAN FAMILY

Student Work Samples




As you examine the samples, consider the following questions:

- In light of the standard/s addressed and the assessment tools provided, what evidence does the work provide that students are achieving proficiency in the knowledge and skills addressed by the standard/s for the task?
- Is the task/activity well designed to help students acquire knowledge and demonstrate proficiency? Is the task/activity clearly aligned with the standards? In what ways would you adapt the task/activity to better meet the needs of your students?


Student Work Sample #1:

My Mean Family



You are a member of a family of 5. This imaginary family may be an extended family, that is to say it may include grandparents, aunt, uncles, and so on. You are one of the five people. The mean age of the family is 23 years.

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 - Determine the median age for you imaginary family



<u>Cristh</u>	<u>Brett</u>	<u>AJ</u>	<u>Mercedez</u>	<u>Alec</u>
Mom	Step Dad	brother	Sister	Me
39	38	13	11	15

mode Median

$$\begin{array}{r}
 52 \\
 -14 \\
 \hline
 18 = \text{Range}
 \end{array}$$

$$\begin{array}{r}
 23 \times 5 = 115 \\
 - 64 \\
 \hline
 51 \\
 4 \overline{) 51} \\
 \underline{40} \\
 11
 \end{array}$$



I took all of the numbers and added them up and took it and divided it by how many people there were, and the ages were 50.

Looking at Student Work – Instructor notes and rating for work sample #1:

Below Basic: The following paper showed very little understanding of the statistics standard being assessed in the rubric. According to the standard students are expected to be able to find the mean, median, mode, and range of a set of data. This student was unable to communicate what their reasoning was and there are multiple misconceptions.

Student Work Sample #2

My Mean Family

You are a member of a family of 5. This imaginary family may be an extended family, that is to say it may include grandparents, aunt, uncles, and so on. You are one of the five people. The mean age of the family is 23 years.

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Lori Terry Mindy Eric Randy

x40 39 6 3 30

(mom) (dad) (sister) (me) (uncle)

40, 39, 30, 6, 3

40
39
14
12
+50
135
-9
127
-9
118

23
5 135
-10
35

My family includes my mom Lori, dad Terry, sister Mindy, me Eric, and my uncle Randy. My mom is 40, dad 39, sister 6, me 3, and my uncle is 30. Firstly, to find the ages I took all their ages, added them up, then divided the added number by five so the quotient would turn out to be 23. I kept up with this process until their ages were right and the mean was 23. The range ages for my family is 37 years by subtracting Lori, 40, and Eric, 3. If my family would have a mode it would mean that the ages of at least 2 family members were the same, that would be my mode. And lastly, the median of my family is 30 or my Uncle Randy's age.

Looking at Student Work – Instructor notes and rating for work sample #2:

Advanced Example: The following example shows the student has a thorough understand of the state standard being evaluated in this task. The explanation is clear, easy to follow and is concise.

INSTRUCTIONAL NOTES

Author Comments

Some students weren't sure how to start when they were given the mean instead of having to find it. Once they got into the task, they had a good time creating their family and sharing comments about them with their classmates.

Task Extensions

Students could be asked to find more than one family with different ages that would fit the given criteria. Adaptations could be made for students by having them only deal with the mean and range or give students what the sum of all the ages must be to get the specified mean.

Common Strategies

Most students were able to identify that the sum of the ages had to equal the product of the mean and number of family members and could easily find ages for their family members. Other students just blindly added up five ages, divided by 5 and hoped that equaled the mean desired in the task.

Common Misunderstandings

Some students mix up the terms. Most are comfortable with finding the range, but confuse mean, median and mode.

Resources

SD Mathematics Content Standards

<http://www.doe.sd.gov/contentstandards/math/index.asp>

SD Assessment and Testing

<http://www.doe.sd.gov/octa/assessment/index.asp>

The National Assessment of Educational Progress (NAEP)

<http://www.doe.sd.gov/octa/assessment/naep/index.asp>

National Council of Teachers of Mathematics

<http://nctm.org/>

Looking at Student Work

<http://www.lasw.org/index.html>